

Diversity of copper and gold deposits in the Eastern Europe Balkan, Carpathian and Rhodopean belts: tectonic, magmatic and geochronological investigations



SCOPES Project - Conference & Field Trip: Macedonia & Serbia

Organizers: A. von Quadt, T. Serafimovski, I. Peytcheva & V. Cvetkovic

May 29 - June 02, 2012 - Izgrev Hotel, Stip, Macedonia

Program, abstracts and field guide, edited by A. von Quadt & T. Serafimovski
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ETH

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Swiss Federal Institute of Technology Zurich



Geological Institute
BAS - Sofia



University "Goce Delcev"-Stip



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- ***Excursion*** to Alshar mineralization (border region Macedonia – Greece) – 01.06.2012
- ***Excursion*** to Buchim porphyry deposit – 02.06.2012

Participant list of the workshop in Stip, May – June 2012

	First name	Name	Institution
1	Todor	Serafimovski	University Goce Delcev, Stip
2	Goran	Tasev	University Goce Delcev, Stip
3	Dobriela	Rogozareva	University Goce Delcev, Stip
4	Aneta	Donkova-Petrushova	University Goce Delcev, Stip
5	Lazar	Georgiev	University Goce Delcev, Stip
6	Violeta	Stefanova	University Goce Delcev, Stip
7	Albrecht	von Quadt	ETH Zurich
8	Stephan	Lehmann	ETH Zurich
9	Joshua	Barcikowski	ETH Zurich
10	Daniela	Gallhofer	ETH Zurich
11	Milorad	Antic	Uni Basel
12	Stefan	Schmid	ETH Zurich
13	Nino	Seghedi	Romanian Academy-Institute of Geodynamics
14	Irena	Peytcheva	BAS - Geological Institute
15	Peter	Marchev	BAS - Geological Institute
16	Valentin	Grozdev	BAS - Geological Institute
17	Stoyan	Georgiev	BAS - Geological Institute
18	Elitsa	Stefanova	BAS - Geological Institute
19	Petyo	Filipov	BAS - Geological Institute
20	Rossitsa	Vassileva	BAS - Geological Institute
21	Zlatko	Peltekovski	University Goce Delcev, Stip
22	Atanas	Hikov	BAS - Geological Institute
23	Valdica	Cvetkovic	University Belgrade, Faculty of Mining and Geology
24	Aleksandar	Pacevski	University Belgrade, Faculty of Mining and Geology
25	Kristina	Saric	University Belgrade, Faculty of Mining and Geology
26	Suzanna	Eric	University Belgrade, Faculty of Mining and Geology
27	Miodrag	Banjesevic	
28	Masa	Radivojevic	University Belgrade, Faculty of Mining and Geology
29	Aleksandar	Miskovic	University of British Columbia, Vancouver
30	Craig	Hart	Department of Earth & Ocean Sciences
31	Bojan	Djordjevic	Avala Resources DOO
32	Sinisa	Glisic	Avala Resources DOO
33	Sibila	Borojevic Sostaric	University Zagreb
34	Dejan	Kozelj	South Danube Metals DOO Beograd
35	Stela	Anatasova	BAS
36	Bayram	Artun	Teck Cominco Limited
37	Daniela	Bombol	EurOmax Macedonia DOOEL Skopje
38	Mihaela-Elena	Cioaca	Geological Institute of Romania
39	Saygun	Keles	Teck Cominco Limited

40	Yassen	Khrischev	Empire Mining Corporation
41	Kemal	Kurcan	Teck Cominco Limited
42	Georgi	Magaranov	Mundoro Capital Inc
43	John	Menzies	Cmi Capital Limited
44	Marian	Munteanu	Geological Institute of Romania
45	Gligor	Saveski	Atlas Copco AB
46	Dechev	Teo	Mundoro Capital Inc
47	Vasil	Andreev	
48	Dorin	Dordea	PROSPECTIUNI SA
49	Veselin	Kovachev	University Sofia
50	Osman	Kurtulus	
51	Dimitar	Tsotsorkov	Asarel
52	Ahmet	Tukac	
53	Bahri	Yildiz	Stratex Madencilik San. Tic. Ltd. Şti
54	Trajca	Toncic	Mining and Metallurgical Company
55	Aleksandar	Pacevski	University Belgrade, Faculty of Mining and Geology
56	Nadka Bozhkova	Vasileva	Ellatzite Mine
57	Zheyazko Hristo	Yalamov	Ellatzite Mine
58	Aurelien	Rombaut	
59		Driver	

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May 29 - June 02, 2012

"Diversity of copper and gold deposits in the Eastern Europe Balkan, Carpathian and Rhodopean belts: tectonic, magmatic and geochronological investigations".

Name		Title	Affiliation
0	Albrecht von Quadt	Opening	ETH Zurich
Regional Geology			
1	Stefan Schmid	Correlation of tectonic units from the Alps to Western Turkey	ETH Zurich
2	Ioan Seghedi	Miocene-Quaternary basalts from East Carpathian volcanic chain, Romania: a mineral chemistry and melt inclusion study	Institute of Geodynamics of Romanian Academy, Bucharest
3	Sibila Borojevic Sostaric	Oligocene shoshonitic rocks of the Rogozna Mts. (Central Balkan Peninsula): evidence of petrogenetic links to the formation of Pb-Zn-Ag ore deposits	Faculty of Mining Geology, Zagreb
4	Kristina Saric	New LA-ICP-MS U/Pb zircon data on various granitoids from the European side of the Tethyan Mesozoic suture	Faculty of Mining and Geology, Belgrade
Regional Metallogeny			
5	Todor Serafimovski	Major Alpine ore districts at the territory of the Republic of Macedonia	University "Goce Delcev"-Stip
6	Daniela Gallhofer	Geodynamics, geochronology and Cu-Au hydrothermal ore provinces in the Banat region and Apuseni mountains	ETH Zurich, IGP
Coffee break			
7	Aleksandar Pacevski	Skarn mineralizations in the Bor ore district: new evidence from study of bornite-chalcopyrite-hematite paragenesis	Faculty of Mining and Geology, Belgrade
Environmental Geology			
8	Lazar Gjorgiev	Technogenous deposits and their environmental impact around the Buchim Mine	University "Goce Delcev"-Stip
9	Aneta Donkova-Petrushova	Au-Ag tellurides and other mineral associations in the Ilovitza Cu-Au deposit	University "Goce Delcev"-Stip
10	Dobriela Rogožareva	Some typical hydrothermal alterations in the Ilovitza Cu-deposit	University "Goce Delcev"-Stip
Lunch			
Deposit Studies			
11	Elitsa Stefanova	Ilovitza porphyry Cu-Au deposit: sequence of vein formation and sulfide deposition	BAS, Geological Institute, Sofia
12	Zlatko Peltekovski	Principle metallogenic features of the Sasa Pb-Zn deposit, Republic of Macedonia	University "Goce Delcev"-Stip
13	Goran Tasev	New data of fluid inclusions study of the Kadiica deposit, Republic of Macedonia	University "Goce Delcev"-Stip
14	Violeta Stefanova	Placer gold prospecting around the Tertiary occurrences in the Republic of Macedonia	University "Goce Delcev"-Stip
15	Rossitza Vassileva	Compositional characteristics of sulphide mineralization from the hydrothermal Madan Pb-Zn deposits: a LA-ICP-MS study	BAS, Geological Institute, Sofia

16	Atanas Hikov	Rare earth element mobility during advanced argillic alteration in Assarel porphyry copper deposit, Central Srednogie, Bulgaria	Elatsite Mine	15.15 - 15.30
Magmatism				
16	Joshua Barcikowski	Magmatic evolution of the Buchim-Damjan-Borov Dol ore district - Petrology-geochemistry	ETH Zurich	15.30 - 15.45
17	Stephan Lehmann	Magmatic evolution of the Buchim-Damjan-Borov Dol ore district- Geochronology-source material	ETH Zurich	15.45 -16.00
	Coffee break			16.00 - 16.30
	Milorad Antic	More than 500 Ma of magmatic and tectonic evolution of the Serbo-Macedonian Massif (south Serbia, southwest Bulgaria and east Macedonia)	University of Basel	
18	Stela Atanasova	Magma Interaction Recorded in Amphiboles from Vitosha pluton, Western Srednogie, Bulgaria”	BAS, Geological Institute, Sofia	16.30 - 16.45
19	Petyo Filipov	Preliminary Data on the Age and Geochemistry of Mesta Volcanic Complex and Central Pirin Pluton	BAS, Geological Institute, Sofia	16.45 - 17.00
20	Stoyan Georgiev	Transect through the Cenozoic magmatism in WSW Bulgaria and Macedonia from Pirin Mountain to Kozhuf: temporal and isotope-geochemistry constraints	BAS, Geological Institute, Sofia	17.00 - 17.15
21	Valentin Grozdev	U-Pb zircon dating and zircon population analyses of the Paleogene magmatic rocks in Kyustendil and Kratovo area.	BAS, Geological Institute, Sofia	17.15 - 17.30
22				17.30 - 17.45

Major Alpine ore districts at the territory of the Republic of Macedonia

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In accordance to the basic principles and major factors of the metallogenetic analysis (structural-morphostructural, magmatic and mineralizing), at the territory of the Republic of Macedonia were determined few major Alpine ore districts: Kratovo-Zletovo, Damjan-Buchim-Borov Dol, Sasa-Toranica, Pehcevo-Ograzden and Kozuf. All of them are enclosed within the Serbo-Macedonian metallogenetic province defined by Jankovic (1967), or more precisely, in metallogenetic zones Lece-Chalkidiki and Besna Kobilica-Osogovo-Tasos defined by Serafimovski (1990, 1993).

All defined Alpine ore districts at the territory of the Republic of Macedonia are characterized by polymetallic mineralization related to the Tertiary magmatism and representative structural-morphostructural forms. Scale of the defined Alpine ore districts at the territory of the Republic of Macedonia are in function of surface manifestations of Tertiary magmatism. Very often in those ore districts has been determined zonal distribution of ore mineralization, laterally and vertically.

From up to date studies it was determined that the biggest ore district is Kratovo-Zletovo that occupies an area of approximately 400 km², which has been determined in the most eastern parts of the well-known Kratovo-Zletovo volcanic area, whose surface manifestations defined an area of around 1200 km². Lead-zinc mineralizations are the main Alpine ores in this ore district mainly localized at sub-volcanic levels within the famous Zletovo Pb-Zn deposit. There the Pb-Zn mineralization is of vein type. Along these mineralizations within this ore district were determined porphyry Cu-Au mineralizations in the Plavica deposit, localized in old, partially deformed volcanic calderas. Morphostructural studies in this region have shown that there are typical collapse calderas in central parts while "parasite" volcanic centers dominate on the peripheral parts. On the peripheral parts were determined uranium mineralizations localized in hydrothermally altered and brecciated volcanics in Zletovska Reka deposit.

Ore district Buchim-Damjan-Borov Dol occupies an area of around 150 km² and it is characterized by skarn iron mineralizations in its central parts as well as with productive copper and gold mineralization in its peripheral parts (Buchim and Borov Dol deposits). At the most peripheral parts in this ore district were registered even narrow Pb-Zn veins. The well-known porphyry copper deposit Buchim is localized in the northern parts of this ore district, within the Precambrian metamorphic complex intruded by andesite-diorite dykes (27.5-24 Ma), around which has been localized porphyry copper mineralization.

Kozuf ore district has been localized in the southern parts of the territory of the Republic of Macedonia close to the national border with Republic of Greece. Opposite to the other ore districts its determination was based on surface manifestations of Pliocene magmatism (6-1.8 Ma) and representative Sb-As-Tl-Au-Cu-Pb-Zn mineral associations. Two deposits are of special interest there, the Alshar and the Dudica deposits. The famous Alshar deposit is divided in three particular parts: northern part where dominates thallium mineralization, central part with prevailing Sb-As mineralizations with interesting gold contents and southern parts that was defined as characteristic Carlin gold type of mineralization. At the Dudica deposit prevails copper mineralization ± gold and Pb-Zn.

In eastern parts of the Republic of Macedonia, or more precisely, within the Besna Kobilica-Osogovo-Tasos metallogenetic zone are located Sasa-Toranica ore district, where prevail lead-zinc mineralizations in Sasa deposit and Toranica deposit, and Pehcevo-Ograzden ore district where prevail copper or copper-gold mineralization, as it is case with the Ilovitza deposit. These ore districts are characterized by specific structural-morphostructural composition, which has direct reflection to the genesis and distribution of polymetallic mineralizations in these areas.

References:

- Jankovic, S., 1967: Metallogenetic provinces and epochs in Yugoslavia. Proceedings of Faculty of Mining and Geology, No. 9/10, Belgrade (in Serbian).
- Serafimovski, T., 1990: Metallogeny of the Lece-Chalkidiki zone. Doctoral thesis, 391 p., Stip. (in Macedonian)
- Serafimovski, T., 1993: Structural-metallogenetic features of the Lece-Chalkidiki zone: Types of deposits and zonation. Faculty of Mining and Geology-Stip, Special issue No. 2, 235 p. (in Macedonian)